The Anatomy of Pedal Vasculature and Principals for Pedal Interventions

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No disclosures
Obstructive Disease Distribution in 1624 patients

- ATG 5%
- FEM POP 55%
- BTK 93%
- BTA 71%

- Foot vessel disease has a strong association with CLI

Below the ankle peripheral artery disease
Ferarresi et al PanVasc Med, 2014
Treating Pedal Lesions Needs Understanding Pedal Vascularization
BTA Treatment Principles

• New concepts: Angiosome model +/-
  Healing vs Patency +

• New Devices: Dedicated balloons +
  Drug eluting ballons (DEB) ++
  Dedicated Stents +

• New techniques: Subintimal
  Retrograde
  Combinations
Anatomy

- First dorsal metatarsal
- Deep plantar
- Arcuate
- Medial plantar
- Dorsalis pedis
- Lateral plantar
- Anterior tibial
- Posterior tibial
- Connection with dorsalis pedis artery
- Medial plantar artery
- Plantar arch
- Lateral plantar artery
- Flexor retinaculum
ANTERIOR CIRCULATION

Anterior Tibial Artery: ATA

Becomes dorsal pedal artery.

This artery ends at the first metatarsal space branches into the arcuate artery

turn sharply to join the perforator branches
POSTERIOR CIRCULATION

Posterior Tibial Artery  PTA

PTA: becomes the common plantar artery in the retromalleolar space.

Divides into:

- lateral plantar artery joins the anterior circulation at the first plantar space.

The medial plantar artery ends at the first metatarsal space, where it becomes the hallux digital arteries.
PEDAL ARCH

Area between the anterior and posterior circulation forms the pedal arcade.

5th MT base to 1st inteross. space

• Central arterial line of the foot

• Major role in limb salvage and ulcers

• Conventional angiography can outline the anastomosis

• Stem supply for all distal forefoot circulation.
Posterior Tibialis Artery

Calcaneal
Medial plantar
Lateral plantar

Arterial-arterial connections

Attinger CE; Plast Reconstr Surg, 2006
Vascular Imaging of the Foot: The First Step toward Endovascular Recanalization

Marco Manzi, MD • Giacomo Cester, MD • Luis M. Palena, MD • Josef Alek, RT • Alessandro Candeo, RT • Roberto Ferraresi, MD
Lateral oblique view

Base of MT5 projects outward

Manzi et al, Radiographics

Bifurcation of common plantar artery
Pedal Vascularulture

First proximal metatarsal space Complete forefoot

Manzi et al, Radiographics

From the dorsal to the plantar portion
Pedal Plantar Loop

- Guidewire loop from the ATA to the PTA through the pedal arch

- Indications
  - No proximal stump
  - Dissection flaps
  - Perforations

Manzi et al; J Cardiovasc Surg 2009
Fusaro; Inv. Cardiol. 2007
Techniques and Devices

- Antegrade access
- Transluminal vs subintimal
- Pedal plantar LOOP
Transluminal vs Subintimal

Subintimal Arterial Flossing.....
SAFARI Spinosa; JVIR 2005
Selective primary Angioplasty
Alexandrescu ; J Endovasc 2008

Primary subintimal angioplasty (SA) and endoluminal angioplasty (EA)

Virtuous Italian style
German freestyle
Japanese art
Advanced Techniques

• transcural – pedal approach
• 0.014`` GW, 1.3-2.8 F support, 4F balloon catheters
Transdorsal to Plantar (TDP) Transplantar to Dorsal (TPA)

Communication via deep perforating artery

Zhu et al. J Endovasc Ther; 2010
Antegrade femoral access

Intraluminal tracking of guidewire

Subintimal tracking

Subintimal tracking before pedo-plantar arch

Subintimal tracking beyond pedo-plantar arch

Transcollateral Angioplasty

PTA

Check vessel quality and anatomy

Blood support: Plus or minus?

Clinical Evidence?

Step by step

Direct retrograde puncture
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